

Sterilization Fugitive Study Results ^(a)
B. Braun Medical Inc. - Allentown, PA

Monitoring Location Description	Corresponding Room ID	Day 1 Monitoring Result (ppb)	Day 2 Monitoring Result (ppb)	Average Monitoring Result (ppb)	Average Monitoring Result (ppm)	Exhaust Flowrate (cfm)	Annual EtO Emissions (lbs/yr)
Loading Hallway Exhaust	1-C06	21.90	127.72	74.81	0.07	2,368	10.63
Unloading Hallway Exhaust	1-170	29.00	68.77	48.89	0.05	6,758	19.83
Aeration Area ^(b)	1-173	74.60	133.19	103.90	0.10	9,601	59.86
Hallway behind Aeration ^(b)	1-C08	142.00	451.48	296.74	0.30	5,167	92.02
Unload Hallway Exhaust near Bay 7	1-170	23.40	37.25	30.33	0.03	1,586	2.89
Sterilizer 7 Bay Exhaust	1-167	240.00	114.72	177.36	0.18	9,083	96.68
DEOXX Scrubber Room Exhaust	1-154	11.30	0.05	5.67	5.67E-03	4,665	1.59
EtO Drum Room Exhaust Fan 1	1-155	3.35	6.98	5.17	5.17E-03	2,963	0.92
EtO Drum Room Exhaust Fan 2	1-155	13.10	66.24	39.67	0.05	2,963	8.50
EtO Drum Room Exhaust Fan 6	1-155	24.90	64.36	44.63	0.04	4,632	12.41
Peak Shaver Building Exhaust	1-181	3.96	4.37	4.17	4.17E-03	4,874	1.22
Dry Bed Enclosure Exhaust	3-154	3.27	18.71	10.99	0.01	1,248	0.82
Bay Exhaust (Bays 2 - 6) ^(c)	1-162 through 1-166	11.60	14.23	12.92	0.01	8,000	6.20
Shipping Warehouse Exhaust	2-181	0.90	0.48	0.69	6.94E-04	22,000	0.92
Total							314.48
Total excluding Sterilizer Bays (1-162 through 1-167) ^(d)							211.60

^(a) B. Braun conducted a fugitive emissions monitoring study from November 8 through November 10, 2021. All potential fugitive exhaust points were identified in the sterilization department. Silonite Ceramic Coated Canisters were placed at each exhaust point for 24 hours. Two canisters were placed at each exhaust point, one for 24 hours on day 1 of the study and one for 24 hours on day 2 of the study. Days 1 and 2 were normal operating days for the sterilization department. All chambers excluding Chamber 1 were in use and pallets were transferred from one stage of the sterilization process to the next as usual. Averaged results from exhaust points on days 1 and 2 were used to extrapolate annual estimated fugitive EtO emissions in pounds using the formula below:

$$\frac{\text{EtO Concentration (ppm)}}{1,000,000} * \text{Exhaust Flowrate (cfm)} * \text{EtO Molar Weight} \left(\frac{\text{lbs}}{\text{lbmol}} \right) * \frac{\text{lbmol}}{385.35 \text{ cf}} * \frac{60 \text{ min}}{\text{hr}} * \frac{8,760 \text{ hr}}{\text{yr}}$$

^(b) The exhaust fans in Room IDs 1-173 and 1-C08 do not run in the winter. To simulate summertime emissions, measurements were taken in the rooms themselves (not at the exhaust point). These measurements were then used in conjunction with exhaust fan CFM in the calculation to estimate fugitives.

^(c) Chamber 1 was removed from routine sterilization service for upgrades/maintenance approximately 4 years ago which is why it was not included in this study.

^(d) Sterilizer Bays exhaust to the Dry Bed System as of 2021. For this reason, total fugitive emissions are also provided without the Sterilizer Bay quantities [i.e., without Sterilizer 7 Bay Exhaust and Bay Exhaust (Bays 2 - 6) emissions].